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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,527	04/26/2001	Christian Fabry	P-1027	9706

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EXAMINER

AFREMOVA, VERA

ART UNIT	PAPER NUMBER
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1651

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/830,527	FABRY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Vera Afremova	1651	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 17-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 17-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/22/2003 has been entered.

### ***Status of claims***

Claims 17-39 as amended are pending and under examination [response papers filed 8/22/2003].

Claims 1-16 were canceled by applicants. [Paper No. 6 filed on 4/26/2001]. Claims 40 and 41 were canceled by applicants [Paper No. 13 filed 12/02/2002].

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17, 23, 24, 26, 29, 30, 31-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Ryu et al. [Journal of Fermentation and Bioengineering. 1995, 80(1), 46-52].

Claims are directed to a process for increasing decolorizing activity of a layer silicate intended for further treatment of oils and waxes wherein the process comprises step of treating the layer silicate with an acid-producing microorganism until pH of not more than about 3.4 is

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obtained. Some claims are further drawn to the use of acid-producing microorganisms that are as sulfur-oxidizing bacteria or iron-oxidizing bacteria belonging to *Thiobacillus ferrooxidans* during the treating step in the process. Some claims are further drawn to addition of microorganisms to an inoculant material prior to treating step, to the use of microbial amounts such as  $10^2$  to about  $10^{10}$  bacteria/g of the inoculant material. Some claims are further drawn to the use of water content during treating step at about 15-70%. Some claims are further drawn to the addition of inoculant material in amount 5-20% of the whole material during treating step. Some claims are further drawn to the addition of microbial nutrients including sulfur-containing products prior to treating step, to maintaining the temperature of the layer silicate during treating step from 20° C to 35° C or to aerating the silicate during the treating step in the process. Some claims are further drawn to a time period of the treating step from 1 day to 365 days. Some claims are further drawn to addition of acid to the layer silicate prior to treating with microorganism. Some claims are further drawn to breaking layer silicate into clumps of a size about 0.5-5 cm prior to treating step.

The reference by Ryu et al discloses a process for treating clays or layer silicates by microbial removal of sulfur and iron wherein the process comprises step of treating the layer silicate or clay with sulfur-oxidizing bacteria and iron-oxidizing bacteria *Thiobacillus ferrooxidans* (see abstract) until pH of not more than about 3.4 is obtained (see Fig. 6). The microbial cells are added an inoculant material prior to treating step in amount  $10^9$  bacteria per g or ml the inoculant material and the inoculant material is added in amount about 5% of the whole material or 5 ml to 100 ml of the MS medium with clay (page 47, col. 1, par. 2). The clay pulp densities that are used in the process of the cited reference are from 5-70% during the treating

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step and, thus, the water content during the treating step is about 30-95% or within the range as required for claimed method. The reference discloses that microbial nutrients including sulfur-containing products of the MS medium are added prior to treating step (page 47, col. 1, lines 1-3). The temperature is about 28°C during clay treatment (page 47, col. 1, par. 2). The incubation chamber or flask is held on a rotary shaker and, thus, the clay that is being treated with bacteria is aerated. The reference discloses the incubation period up to 12 days (fig. 6). The reference also discloses that initial pH is adjusted to about 2 before addition of bacteria (page 47, col. 1, par. ) and, thus, it teaches the addition of acid to the layer silicate prior to treating with microorganism. In addition, it also teaches that the microbial growth inhibitors that might be present in the starting raw material can be removed by acid pretreatment (page 29, col. 1, par. 2). The reference also teaches crushing or breaking layer silicate into clumps of a size about 0.5 cm prior to treating step (see page 46, col. 2, at section "clay samples").

Therefore, the cited reference discloses identical active step and all identical structural elements as required by the claimed method. Thus, the final results or effects of the method of the cited reference are reasonably expected to be identical to the result or effects of the claimed method. Although the reference by Ryu et al is primary concerned with the removal of sulfur and iron from clays rather than increasing decolorizing activities of clays, the clays obtained by the method of Ryu would be inherently characterized by decolorized activity that is increased at least to some degree within the meaning of the claimed invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2,813,821 taken with Rutkowski et al. [STN CAPLUS 1981:535117/an; Przemysl Chemiczny (1981), 60 (5), 287-289], Kusnierova et al. [Mineralia Slovaca (1996), 28:365-367; this is full text of the IDS-6/27/2002. cit. No. 1 or CA ref. 866899e], Chaudhury et al. [Erzmetall. 1990, 43 (5), 210-212] and Ryu et al. [Journal of Fermentation and Bioengineering. 1995, 80(1):46-52] .

Claims are directed to a process for increasing decolorizing activity of a layer silicate intended for further treatment of oils and waxes wherein the process comprises step of treating the layer silicate with an acid-producing microorganism until pH of not more than about 3.4 is obtained. Some claims are further drawn to the use of the various layered silicates including bentonite, montmorillonite, to the use of various acid-producing microorganisms including *Aspergillus niger* and *Thiobacillus sp.* Some claims are further drawn to the use of inoculant material at particular amounts, to addition of microbial nutrients, to the use of conditions including amount of water, temperature, aeration, period of incubation, size of materials under treatment and to the pretreatment of materials.

US 2,813,821 teaches a method of making a porous absorbent material by microbial treatment wherein initial porous material is treated with microbial fluid including microbial cells or filaments in order to change or to improve the properties of the porous material such as increasing effective surface area to the volume of the porous material (col. 1, lines 15-30 and lines 56-60; col. 2, lines 35-50). The improved porous material of the cited patent is intended as "catalyst" for the processes employing conversion of hydrocarbons or oils, fats and waxes (col. 2, lines 35-39) and/or absorption (col. 2, line 48).

The teaching of the cited patent US 2,813,821 is not particularly clear with respect to the decolorizing activity of final porous materials having the improved/increased surface to volume ratio. However, the reference by Rutkowski et al demonstrates that it is known in the prior art

that the improved porosity of the absorbent material is directly related to the decolorizing power of the porous materials including the oil decolorizing power of clays. See English abstract of the reference by Rutkowski et al.

In particular, the cited patent US 2,813,821 teaches a treatment of silica or silica alimuna with microorganisms including acid-producing *Aspergillus niger*, for example: see col. 6, lines 40 and line 54. According to the applicants definitions the “silica” porous materials of US 2,831,821 are not clays and are not “layered silicates” (response filed 12/02/2002, pages 11-12 or page 5, last paragraph).

Thus, US 2,813,821 is lacking disclosure of clays or layered silicates including smectite, montmorillonite, bentonite and palygorskite as materials under microbial treatment. However, the cited US 2,813,821 clearly suggests that other their porous materials that are regularly employed during absorption procedures, including conversion of hydrocarbons, can be treated with microorganisms and improved with regard to their porosity or absorbent capacity/activity.

The reference by Rutkowski et al demonstrates that it is known in the prior art that the decolorizing power of clays is improved through increasing surface area of their pores.

Further, the reference by Kusnierova is relied upon to demonstrate that clays or layered silicates including montmorillonite and bentonite are effectively treated and destructed with microorganisms including acid-producing microorganisms *Aspergillus niger* and *Thiobacillus* (see abstract).

The cited patent US 2,813,821 teaches that the initial porous materials are subjected to microbial treatment under conditions suitable for microbial growth in order to improve porosity of materials. The suitable conditions including pH, nutrients, aeration and temperature are adjusted with respect to the microorganism that is employed in the method (col. 4, lines 4-32). The cited patent indicates some generic pH for growing generic microorganism. But it is lacking disclosure related to a particular pH value of 3.4 and below.

However, the cited reference by Ryu et al. teaches that optimal pH for growing *Thiobacillus* is 2-4 (page 46, col. 2, par. 2) and that the clays are treated by *Thiobacillus* until pH is no more than 3.4 (fig. 6).

Further, the reference by Chaudhury et al. demonstrates that the culture filtrates derived from *Aspergillus niger* with pH 3.5 are used for clay treatments (see abstract and page 210, col.2, lines 1-5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to treat layered silicates or clays with microorganisms including acid-producing microorganisms with a reasonable expectation of success in increasing decolorizing activity of clays because the decolorizing activity of clays is directly related to their porosity and absorbent capacity and because the microorganisms including acid-producing microorganisms are suitable for improving porosity of materials. One of skill in the art would have been motivated to use acid-producing microorganisms including representatives of the genera *Thiobacillus* and *Aspergillus* for the expected benefits in degrading or deconstructing mineral-containing materials including clays because these microorganisms are known and have been demonstrated as capable to grow on clays and to be effective to degrade, bleach and destructure clays and, thus, to increase porosity of clays. One of skill in the art would have been motivated to treat clays with microorganisms under acidic conditions or until acidic conditions are about 3.4 or below because these acidic conditions are the growth requirement of microorganisms including *Thiobacillus* or *Aspergillus* that have been used for clay degradation and/or deconstructing. One of skill in the art is free to select between various clay materials including bentonite, montmorillonite or others because the clay materials can be deconstructed by microorganisms as adequately demonstrated by the prior art. The temperature, aeration, nutrients, amounts of microbial cells, amounts of water, time period for incubation are adjusted with regard to culturing of a particular microorganism employed in the process and, thus,



optimization of the process with regard to the microbial growth requirement and conditions is reasonably considered to be within the purview of the ordinary skill practitioner. Thus, the claimed invention as a whole was clearly prima facie obvious, especially in the absence of evidence to the contrary.

The claimed subject matter fails to patentably distinguish over the state art as represented by the cited references. Therefore, the claims are properly rejected under 35 USC § 103.

***Response to Arguments***

Applicant's arguments with respect to claim as amended have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vera Afremova whose telephone number is (703) 308-9351. The examiner can normally be reached on Monday to Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn, can be reached on (703) 308-4743. The fax phone number for this Group is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Vera Afremova,

Art Unit 1651  
October 31, 2003.

VERA AFREMOVA

PATENT EXAMINER

